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09/744,360	01/22/2001	Robert Bruce Darling	UOFW116278	5147

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EXAMINER

QUASH, ANTHONY G

ART UNIT PAPER NUMBER

2881

DATE MAILED: 06/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/744,360

Applicant(s)

DARLING ET AL.

Examiner

Anthony Quash

Art Unit

2881

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 59-88 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 59-88 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

1. Applicants' amendment, dated 3/29/04, has overcome the 112 rejections listed in the last office action.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 59-66,77-88 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Hayafuji [493] in view of Liebert [324]. As per claims 59,77, Hayafuji [493] teaches a faraday cup detector (10) comprising a partially insulated conductive housing in which the cup is supported, the conductive housing being electrically connected to a reference potential and a means for electrically connecting the cup to an electronic interface, wherein the cup has a unit cell comprising two conductive material-clad insulating walls separated by conductive material, each insulating wall having a first conductive surface in electrical contact with the conductive material and a second conductive surface electrically connected to the reference potential, the conductive material and two first conductive surfaces defining a conductive cup. In addition, it also teaches the conductive housing being comprised of a silicon wafer. See Hayafuji [493] abstract, figs. 2,5A-7, col. 1 lines 5-35, 45-62, col. 2 lines 5-10, 20-68, col. 3 lines 1-45,

col. 4 lines 15-68, column 5, col. 7 lines 10-65, and columns 8-9. However, Hayafuji [493] does not explicitly state using a plurality of faraday cup detectors. Hayafuji [493] also does not explicitly teach the plurality of cups having a pitch (as defined by applicants' specification) of less than a millimeter. Liebert [324] does teach the use of an array of faraday cup detectors along with means for electrically connecting the plurality of cups to an electronic interface. See Liebert [324] abstract, fig. 1, col. 1 lines 45-68, col. 2 lines 40-60, col. 4 lines 5-50, col. 5 lines 1-15, and col. 6 lines 5-11.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use plurality of faraday cup detectors in order to measure the current distribution of the beam at different location on the wafer. It also would have been obvious to one of ordinary skill in the art at the time the invention was made to make the plurality of cups have a pitch of less than a millimeter in order to increase the number of faraday cups used thereby providing a more accurate image of the beam distribution.

As per claim 60, Hayafuji [493] in view of Liebert [324] teach all aspects of the claim except for explicitly stating that the conductive housing be comprised of aluminum. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the conductive housing be comprised of aluminum, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

As per claim 61,79, Hayafuji [493] teaches the reference potential being a ground potential. See Hayafuji [493] fig. 2, and col. 5 lines 20-35.

As per claim 62, Hayafuji [493] in view of Liebert [324] teach all aspects of the claim except for explicitly stating that the conductive material be comprised of copper. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the conductive material be comprised of copper, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

As per claim 63, Hayafuji [493] in view of Liebert [324] teach all aspects of the claim except for explicitly stating that the conductive material-clad insulating wall be comprised of copper/fiberglass/copper laminate sheet. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the conductive material-clad insulating wall be comprised of copper/fiberglass/copper laminate sheet, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

As per claims 64,81, Liebert [324] teaches the electrical connecting means connecting the conductive cup to the electronic interface being selected from the group consisting of a metal wire and a metal foil. See Liebert [324] fig. 1, col. 1 lines 45-55, and col. 2 lines 40-60.

As per claims 65, 82, Hayafuji [493] in view of Liebert [324] teach all aspects of the claim except for explicitly stating that the array comprise 64 faraday cups. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the array be comprised 64 faraday cups, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art.

As per claims 66,83, Hayafuji [493] in view of Liebert [324] teach all aspects of the claim except for explicitly stating that the array comprise 256 faraday cups. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the array be comprised 256 faraday cups, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art.

As per claim 78, Hayafuji [493] teaches the conductive material being selected from the group consisting of polysilicon and tungsten. See Hayafuji [493] col. 4 lines 55-69.

As per claim 80, Hayafuji [493] teaches the insulator being comprised of silicon dioxide. See Hayafuji [493] col. 7 lines 50-60, and col. 8 lines 1-10.

As per claim 84, Liebert [324] teaches the array being a linear array. See Liebert [324] fig. 2, col. 4 lines 4-10.

As per claim 85, Hayafuji [493] in view of Liebert [324] teach all aspects of the claim except for explicitly stating that the array be a two-dimensional array. Liebert [324] does however teach that the faraday cup can be located in a variety of patterns and locations for sensing the ion beam. See Liebert [324] col. 6 lines 5-10. Therefore,

it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the array be a two-dimensional array in order to sense the ion beam at different locations, since it has been held that rearranging parts of an invention involves only routine skill in the art.

As per claim 86, Hayafuji [493] in view of Liebert [324] all aspects of the claim except for explicitly stating the forming the well by deep reactive ion etching process. Hayafuji [493] does teach the forming of the well by chemical etching. See Hayafuji [493] col.7 lines 20-30. It is also well known in the art to form wells by ion etching. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the wells by deep reactive ion etching as a matter of obvious design choice.

As per claim 87, Hayafuji [493] in view of Liebert [324] all aspects of the claim except for explicitly stating the forming the well by an anisotropic hydroxide etching process. Hayafuji [493] does teach the forming of the well by chemical etching. See Hayafuji [493] col.7 lines 20-30. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the wells by an anisotropic hydroxide etching process as a matter of obvious design choice.

As per claim 88, Hayafuji [493] in view of Liebert [324] teach all aspects of the claim except for explicitly stating that array have a pitch from about 100 μm to about 500 μm . It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the array have a pitch from about 100 μm to about 500 μm ,

since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art.

3. Claims 67-76 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Hayafuji [493] in view of Okuda [742]. As per claim 67, Hayafuji [493] teaches a faraday cup detector (10) comprising a partially insulated conductive housing in which the cup is supported, the conductive housing being electrically connected to a reference potential and a means for electrically connecting the cup to an electronic interface, wherein the cup has a unit cell comprising two conductive material-clad insulating walls separated by conductive material, each insulating wall having a first conductive surface in electrical contact with the conductive material and a second conductive surface electrically connected to the reference potential, the conductive material and two first conductive surfaces defining a conductive cup. See Hayafuji [493] abstract, figs. 2, 5A-7, col. 1 lines 5-35, 45-62, col. 2 lines 5-10, 20-68, col. 3 lines 1-45, col. 4 lines 15-68, column 5, col. 7 lines 10-65, and columns 8-9. However, Hayafuji [493] does not explicitly state using a plurality of faraday cup detectors. Hayafuji [493] also does not explicitly teach the plurality of cups having a pitch (as defined by applicants' specification) of less than a millimeter. Okuda [742] does teach an array of faraday cup detectors. Okuda [742] also teaches the conductive housing being comprised of a metal block having length, width, and thickness, and a plurality of channels machined through its thickness for receiving the cups, wherein the block is bonded to an insulating substrate having means for connecting the cup to an electronic interface, the means for electrically connecting the cup to the interface being in electrical connection

with the cup. See Okuda [742] abstract, figs. 1-4,6-9, col. 1 lines 30-68, column 2, col. 3 lines 40-65, col. 4 lines 1-40, col. 5 lines 30-35, and col. 6 lines 1-5, 20-26. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use plurality of faraday cup detectors in order to measure the current distribution of the beam and different location on the wafer. With respect to the applicants' claim concerning the block being made of oxidizable metal, Hayafuji [493] does teach the conductive housing being made of metal. See Hayafuji [493] col. 3 lines 30-4, and col. 4 lines 50-68. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the conductive housing be made of oxidizable metal, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. It also would have been obvious to one of ordinary skill in the art at the time the invention was made to make the plurality of cups have a pitch of less than a millimeter in order to increase the number of faraday cups used thereby providing a more accurate image of the beam distribution.

As per claim 68, Hayafuji [493] in view of Okuda [742] teach all aspects of the claim except for explicitly stating the metal be selected from the group consisting of aluminum, copper, nickel, and titanium. It would have been obvious to one having ordinary skill in the art at the time the invention was made to metal be selected from the group consisting of aluminum, copper, nickel, and titanium, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

As per claim 69, Hayafuji [493] in view of Okuda [742] teach all aspects of the claim except for explicitly stating that the conductive material be comprised of copper. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the conductive material be comprised of copper, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

As per claim 70, Hayafuji [493] teaches the reference potential being a ground potential. See Hayafuji [493] fig. 2, and col. 5 lines 20-35.

As per claim 71, Hayafuji [493] in view of Okuda [742] teach all aspects of the claim except for explicitly stating that the insulator be comprised of aluminum oxide. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the insulator be comprised of aluminum oxide, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

As per claims 72,73, Hayafuji [493] in view of Okuda [742] teach all aspects of the claims except for explicitly stating that the insulating substrate be comprised of printed circuit board and that the means for electrically connecting the cup to electronic interface be a trace on a printed circuit board. It would have obvious to one of ordinary skill in the art at the time the invention was made to have the insulating substrate be comprised of printed circuit board and that the means for electrically connecting the cup to electronic interface be a trace on a printed circuit board since is well known in the art

to use a wafer (a wafer is presented in Hayafuji [493]) to form printed circuit board and also to form electrical connections on printed circuit board be connected by traces.

As per claim 74, Hayafuji [493] in view of Okuda [742] teach all aspects of the claim except for explicitly stating that the array comprise 64 faraday cups. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the array be comprised 64 faraday cups, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art.

As per claim 75, Hayafuji [493] in view of Okuda [742] teach all aspects of the claim except for explicitly stating that the array comprise 256 faraday cups. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the array be comprised 256 faraday cups, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art.

As per claim 76, Okuda [742] teaches the array being a two-dimensional array. See Okuda [742] See Okuda [742] abstract, figs. 1-4,6-9, col. 1 lines 30-68, column 2, col. 3 lines 40-65, col. 4 lines 1-40, col. 5 lines 30-35, and col. 6 lines 1-5, 20-26.

Response to Arguments

4. With respect to the applicants' arguments concerning, the plurality of cups having a pitch of less than a millimeter, it the examiner's view that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the plurality of cups have a pitch (as defined by applicants' specification) of less than a millimeter in

order allow one increase the number of cups used to detect the beam so as to obtain a more accurate image of the distribution of the beam.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Quash whose telephone number is (571)-272-2480. The examiner can normally be reached on Monday thru Friday 9 a.m. to 5 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (571)-272-2477. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A. Quash

AQ
6/26/04

Nikita Wells
NIKITA WELLS
PRIMARY EXAMINER
06/28/04